REMARKS

In view of the above amendments and the following remarks, reconsideration of the rejections contained in the Office Action of July 2, 2003 is respectfully requested.

As initial matter, the specification has been revised in order to provide antecedent basis and a clear intended meaning of several terms used in the claims. In particular, paragraph [0121] of the substitute specification filed on June 20, 2002 has been amended in order to provide an antecedent basis for the term "vacuum chamber wall portion" as used in the amended claims. In addition, paragraph [0124] of the substitute specification has been amended to make changes similar to those made to [0114] in the amendment filed March 20, 2003. Because the specification amendments are fully supported by the original disclosure, it is submitted that no new matter has been added by any of these changes. Thus, the Examiner is respectfully requested to approve and enter these amendments.

The Examiner has rejected claims 66, 67, 78, and 79 under 35 U.S.C. § 112, second paragraph, as being indefinite. In particular, the Examiner asserts that the phrase "outside of said dielectric window" is ambiguous. In view of these rejections, independent claims 66 and 78 have now been amended as indicated above to clarify the recited arrangement. In particular, claims 66 and 68 now clearly recite that the annular groove is arranged outside of "an outer edge of a vacuum chamber wall portion" of the dielectric window. An explanation of this amendment will now be provided with reference to the drawings of the present application. However, reference to the drawings is provided only for the Examiner's benefit, and is not intended to otherwise limit the scope of the claims to the specific embodiments of the present application.

As explained in the amended portion of paragraph [0121] of the substitute specification with reference to Figure 8, the vacuum chamber wall portion 10 (the cross-hatched portion) of the dielectric window 14 is surrounded by the plasma trap 9. Furthermore, paragraph [0124] of the substitute specification has now been amended to clearly define that the term "outside" as used in this application means farther from the vertical center axis of the vacuum chamber. Thus, as clearly illustrated in Figure 8, the annular groove 9 is arranged "outside" the outer edge

of the vacuum chamber wall portion 10 of the dielectric window 14. The Examiner is requested to note that this feature is also present in the embodiments illustrated in Figures 10 and 11 of the present application, and those embodiments also read on the elected invention of Group 1 and Species 2. In view of the amendments to claims 66 and 78, as well as the amendments to the specification and the above explanation, it is respectfully submitted that the Examiner's rejections under § 112 have now been overcome.

The Examiner has indicated that claims 56-63 and 68-75 have been withdrawn as being directed to a non-elected invention and/or species. Thus, the Examiner is requested to note that these claims have now been cancelled. However, the Examiner is also requested to note that new dependent claims 80-83 have now been added, and it is submitted that these claims read on the elected invention of Group 1 and Species 2.

The Examiner has rejected claims 64, 67, and 76-79 as being unpatentable over the Higuchi reference (USP 5,783,492) in view the Chen reference (USP 5,824,605); has rejected claims 64 and 76 as being unpatentable over the Bhardwaj reference (USP 6,259,209) in view of Higuchi reference; and has rejected claims 64-67 and 76-79 as being unpatentable over the Tomoyasu (USP 5,904,780), also optionally considering the Highuchi reference. However, in view of the above amendments and the following remarks, the Examiner's rejections of claims 64-67 and 76-79 are respectfully traversed.

Independent claim 64 is directed to a method of generating plasma, comprising processing a substrate using generated plasma while controlling plasma distribution on the substrate using a *single* annular groove arranged at a dielectric window so that an outer-side face of the annular groove is located inside of an inner surface of a sidewall of the vacuum chamber, and so that the annular groove has a groove width *in a range of 3 mm to 50 mm*. Paragraph [0129] of the present application explains that the range of 3 mm to 50 mm for the width of the annular groove of the present invention has been carefully determined to ensure that hollow cathode discharge occurs in the annular groove.

The Examiner acknowledges that the Higuchi reference does not provide a specific range for the width of the groove. Nonetheless, the Examiner asserts that the Higuchi reference teaches that the groove depth of the groove H_1 is 5 cm (50 mm). Furthermore, the Examiner asserts that "while one cannot assume that figures are to scale, the groove width is illustrated as approximately the same size as the depth of the recess or groove, so it would have been suggestive to, thus obvious to one of ordinary skill in the art that similar dimension would have been employed therefore." However, contrary to the Examiner's position, it is submitted that the Higuchi reference does not even suggest a groove width with a range of 3 mm to 50 mm, as explained below.

As initial matter, the width range for the annular groove of the present invention has been specifically selected to achieve a desired benefit as explained above, and is thus not an arbitrary feature of the present invention. However, the Higuchi reference does not even *suggest* that the width of the groove should be maintained within a specific range to achieve some desired result. Moreover, as the Examiner implies in the Office Action, it is improper to assume that drawings in a patent have been drawn to scale, although the Examiner appears to rely on this assumption anyway. If, however, the scale of the drawings (and, particularly, Figure 9) of the Higuchi reference *is* assumed to be accurate, then the Examiner is requested to note that the width of the groove illustrated in Figure 9 is 11% greater than the depth. Thus, based on the given depth for the groove of 50 mm, the width of the groove would be at least 55 mm, which is significantly outside the carefully selected range of 3 mm to 50 mm for the present invention (as explained in paragraph [0129] of the present specification, if the groove width is over 50 mm, there is a possibility that hollow cathode discharge will not occur by the groove). Consequently, it is submitted that the Higuchi reference does not disclose or even suggest an annular groove having a groove width in a range of 3 mm to 50 mm.

Figure 14 of the Tomoyasu reference illustrates an embodiment of a plasma processing apparatus in which barrier 116 extends from a flat surface of a wave-transmitting window 114 to form openings 120, 121. The Tomoyasu reference, however, does not disclose or suggest that

the barriers 116 are spaced apart so that the openings 120, 121 form an annular groove with a groove width in a range of 3 mm to 50 mm. Nonetheless, the Examiner asserts that an alternate embodiment of the plasma processing apparatus illustrated in Figures 11 and 12 of the patent includes barriers 110 that are described as having a length from 10 mm to 20 mm (see column 13, lines 19 and 20), and the Examiner assumes that this range can thus also be attributed to the barriers 116 of the embodiment illustrated in Figure 14. Furthermore, because the cross-sectional dimension of the openings 120, 121 shown in Figure 14 appears to be square, the Examiner further assumes that one of ordinary skill in the art would then be able to understand that the width of the opening is equal to the length of the barriers 110 illustrated in Figure 12 (i.e., 10 mm to 20 mm).

However, it is submitted that the Tomoyasu reference does not provide any such suggestion regarding the width of the openings 120, 121. Firstly, the barriers 110 of the embodiment illustrated in Figures 11 and 12 of the Tomoyasu reference are linear segments formed in a "star" pattern as shown in Figure 12, which is significantly different than the concentric pattern formed by the barriers 116 in Figure 14. Thus, it is submitted that the Examiner's assumption that the length of the barriers 110 of the embodiment illustrated in Figures 11 and 12 are the same as the length of the barriers 116 in Figure 14 is baseless. Furthermore, as discussed above with respect to the Higuchi reference, it is entirely improper to assume that drawings in a patent are drawn to scale. Finally, the Tomoyasu references does not provide any suggestion that the width of the openings 120, 121 is an important feature and should be maintained in a particular range in order to achieve a particular result. Consequently, it is submitted that the Tomoyasu reference also does not disclose or even suggest an annular groove having a groove width in a range of 3 mm to 50 mm.

In addition to the above distinction, the Examiner is requested to note that the Tomoyasu reference also does not disclose or even suggest a *single* annular groove arranged at the dielectric window, as recited in independent claim 64.

The Bhardwaj reference and the Chen reference also do not disclose or even suggest an annular groove having a width in a range 3 mm to 50 mm. Furthermore, the Bhardwaj reference also does not disclose or suggest a *single* annular groove. Therefore, it is submitted that one of ordinary skill in the art would not be motivated to modify or combine the references so as to obtain the invention recited in independent claim 64. Accordingly, it is respectfully submitted that independent claim 64 and the claims that depend therefrom are clearly patentable over the prior art of record.

The Examiner is requested to note that independent claims 66, 76, and 78 also recite an annular groove that has a groove width in a range of 3 mm to 50 mm. As explained above with respect to independent claim 64, the Higuchi reference, the Tomoyasu reference, the Chen reference, and the Bhardwaj reference do not, either alone or in combination, disclose or suggest a plasma processing method or apparatus employing an annular groove having a groove width in a range of 3 mm to 50 mm. Accordingly, for the same reasons as discussed above with respect to independent claim 64, it is submitted that independent claims 66, 76, and 78 are also clearly patentable over the prior art of record.

Finally, the Examiner is requested to note that new dependent claims 80 through 83 recite subject matter that further distinguishes the present invention from the prior art.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. However, if the Examiner should have any comments or suggestions to help speed the prosecution of this application, the Examiner is requested to contact the Applicant's undersigned representative.

Respectfully submitted,

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